Lower Darby Creek Area Superfund Site Overview

Delaware Estuary Program Science and Technical Advisory Committee Meeting

March 10, 2022

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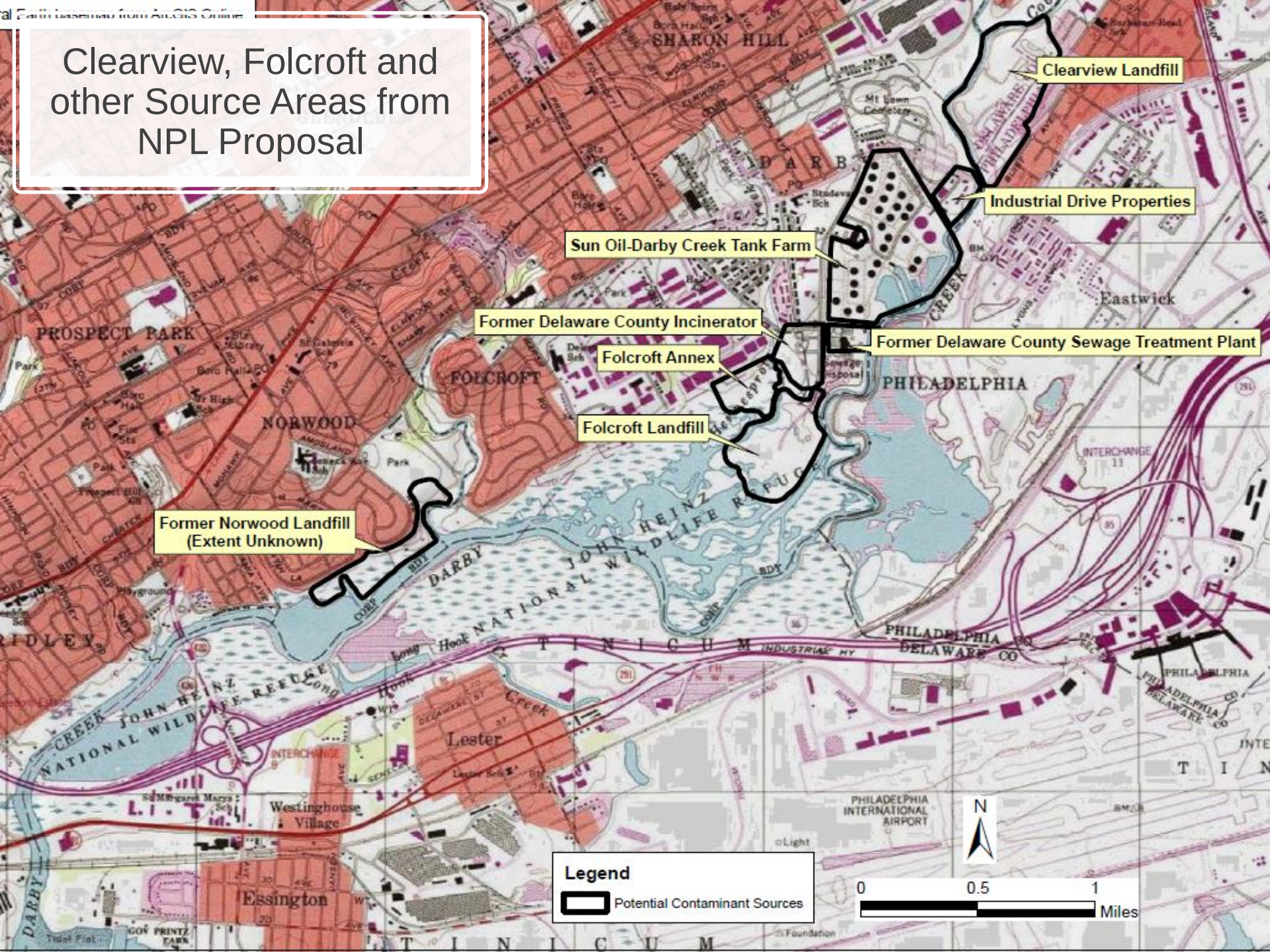
Clearview, Folcroft and other Source Areas from NPL Proposal



Lower Darby Creek Area (LDCA) Superfund Site

- Originally proposed to the NPL in 2000 and included six separate sources.

- Finalized on NPL in June 2001 and included only Clearview and Folcroft Landfills.

- Current Operable Units (OUs):
  - OU1 – Clearview Soil and Waste
  - OU2 – Folcroft Landfill
  - OU3 – Clearview Groundwater
  - OU4 – Aquatic Environments

- Mixed industrial, commercial, recreational and residential use as well as John Heinz National Wildlife Refuge

Clearview & Folcroft History & Setting

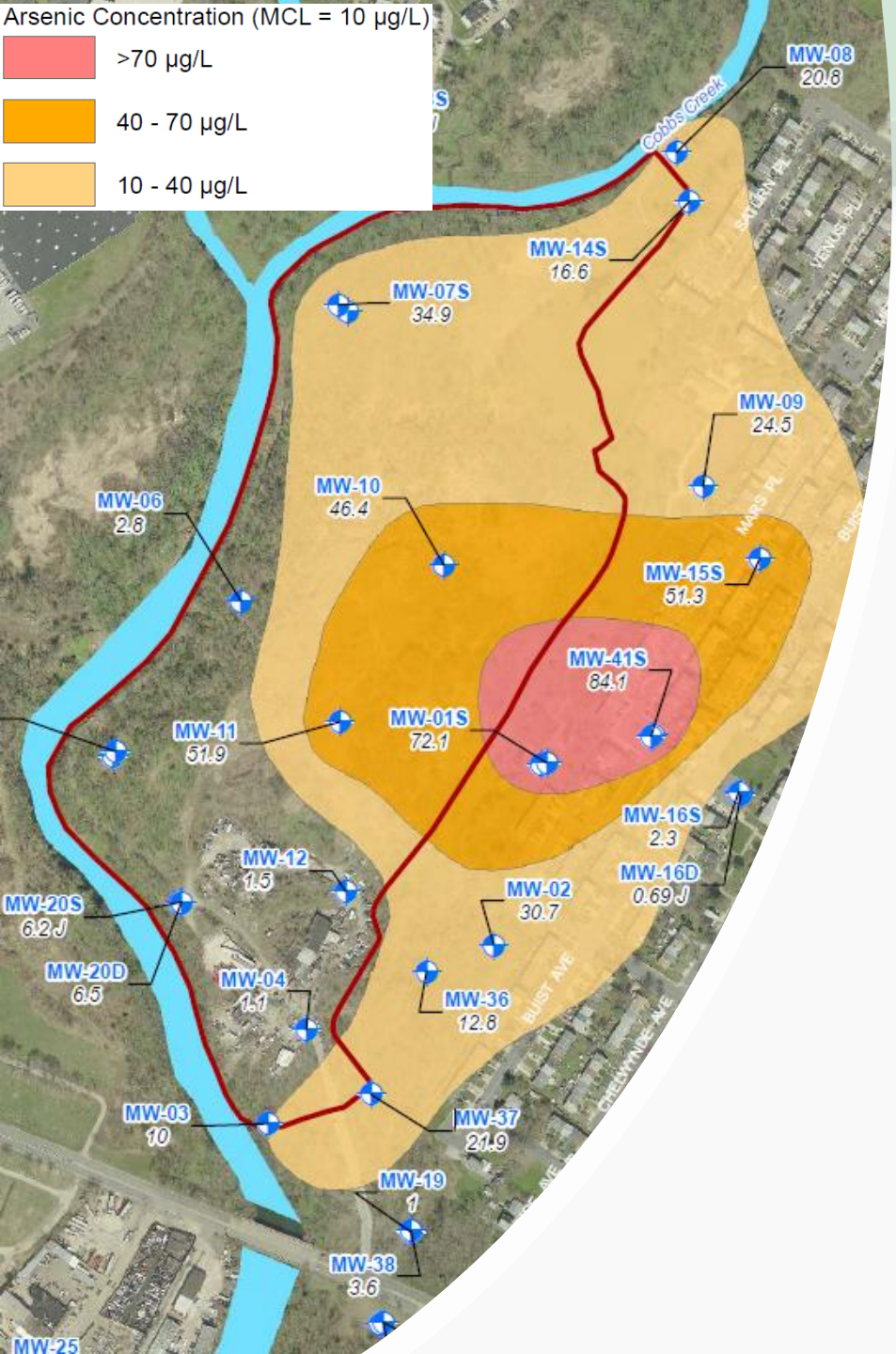
- Former wetlands. Located within 100-year floodplain.
- Operation: Late ‘50s or early ’60s start until mid-’70s; accepted municipal, industrial, hospital wastes, incinerator ash, and sewage sludge
- Folcroft & Annex – approx. 46 acres
- Clearview – approx. 64 acres
- Darby and Cobbs Creek Watersheds
- Tidally influenced by Delaware River up to Clearview

Clearview Landfill Cleanup

- Residential Yard remediation
- Excavation of contaminated soil and waste from Eastwick Regional City Park, placement on the landfill and “capped” with a forested Evapotranspiration (ET) Cover.
- Stabilize and reinforce streambanks with natural features to prevent erosion.
- Business relocation, restoration, mitigation wetlands, long-term operation and maintenance

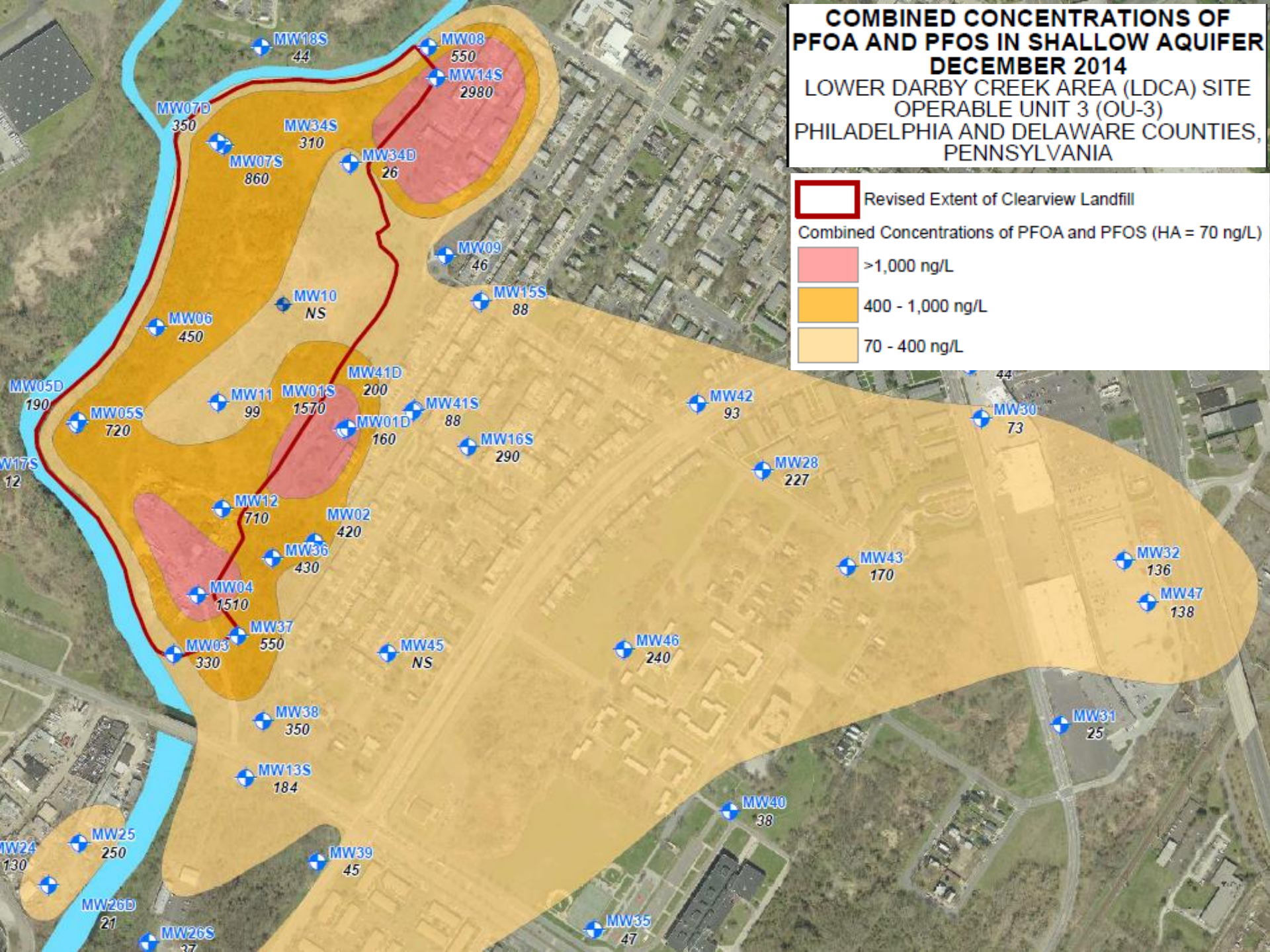
OU1 RA Progress & Schedule

- Contaminants of Concern:
  - Benzo(a)pyrene and other PAHs
  - PCBs
  - Pb, Cd, Cu, Zn
- 200 residential parcels
- 37 acres remediated
- 2,800 feet of streambank stabilized
- 30 acres remaining
- Landfill construction complete by end of 2023

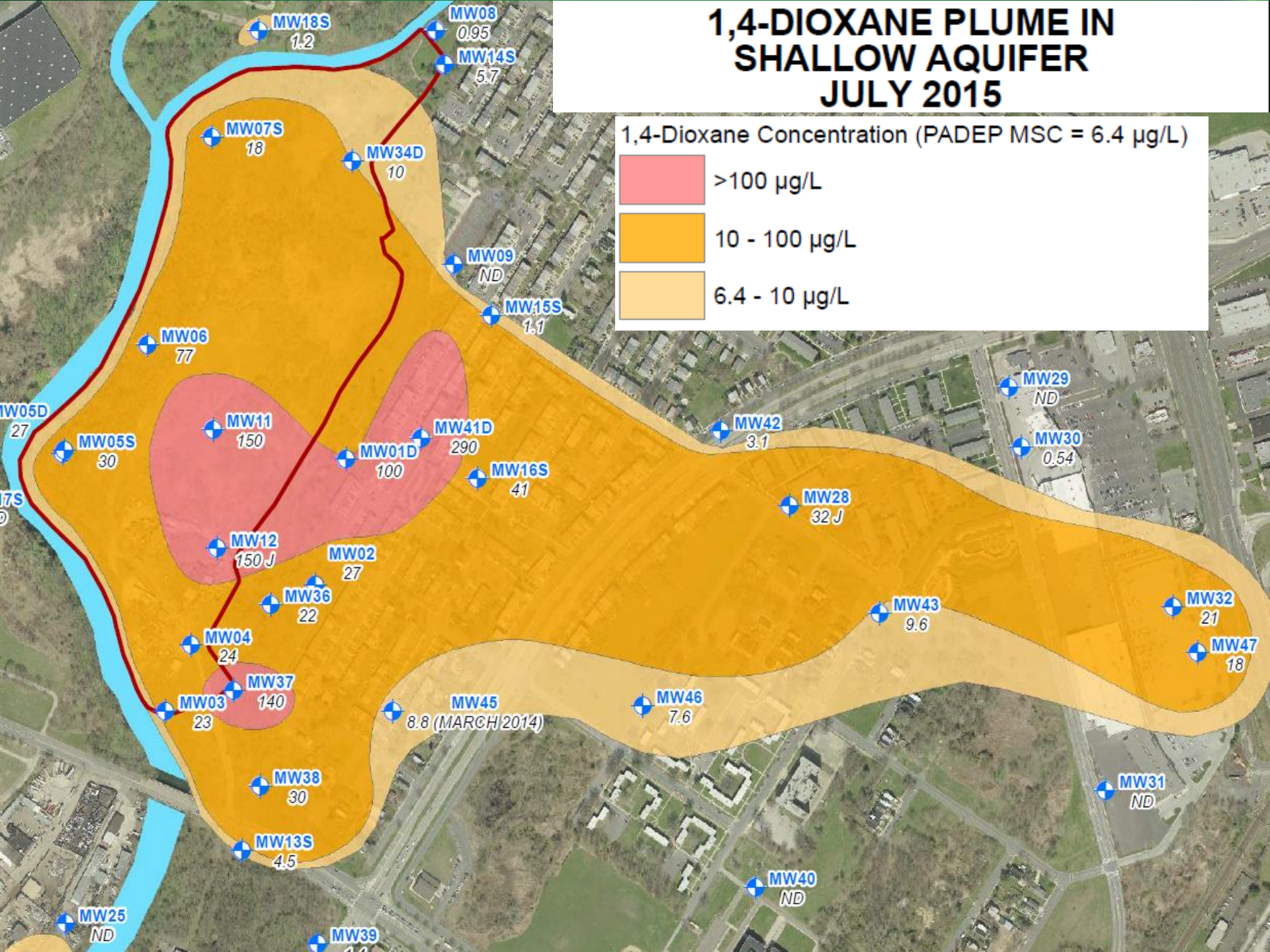


LDCA OU3 Clearview Groundwater

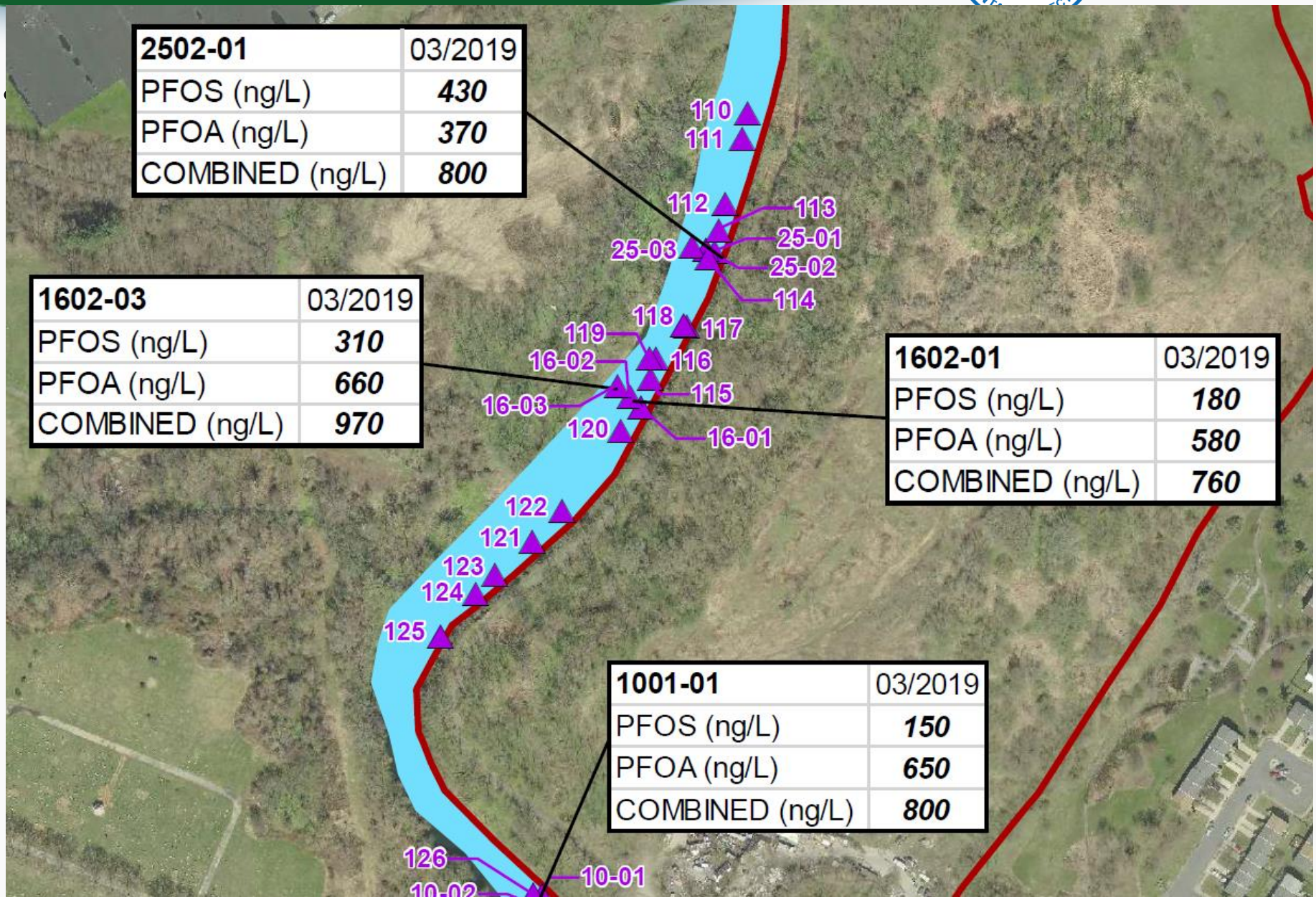
- Remedial Investigation Complete
- Focused Feasibility Study (FFS) targeted for completion Dec. 2022
- FFS for Interim Remedy to contain GW in shallow aquifer at waste boundary (red border at left)
- Primary Contaminants of Concern:
  - PFOA, PFOS
  - 1,4-Dioxane
  - Arsenic
- Lower concentrations and/or sporadic detections of several VOCs, SVOCs, pesticides, inorganics, and dioxins/furans, PCBs


COMBINED CONCENTRATIONS OF PFOA AND PFOS IN SHALLOW AQUIFER DECEMBER 2014
LOWER DARBY CREEK AREA (LDCA) SITE
OPERABLE UNIT 3 (OU-3)
PHILADELPHIA AND DELAWARE COUNTIES, PENNSYLVANIA
Revised Extent of Clearview Landfill
Combined Concentrations of PFOA and PFOS (HA = 70 ng/L)
>1,000 ng/L
400 - 1,000 ng/L
70 - 400 ng/L
MW18S 44
MW08 550
MW14S 2980
MW07D 350
MW34S 310
MW07S 860
MW34D 26
MW09 46
MW10 NS
MW15S 88
MW06 450
MW41D 200
MW05D 190
MW11 99
MW01S 1570
MW41S 88
MW05S 720
MW01D 160
MW16S 290
MW42 93
MW30 73
MW28 227
MW12 710
MW02 420
MW36 430
MW43 170
MW32 136
MW04 1510
MW47 138
MW37 550
MW03 330
MW45 NS
MW46 240
MW38 350
MW31 25
MW13S 184
MW40 38
MW25 250
MW24 130
MW39 45
MW26D 21
MW26S
MW35 47

1,4-DIOXANE PLUME IN SHALLOW AQUIFER JULY 2015



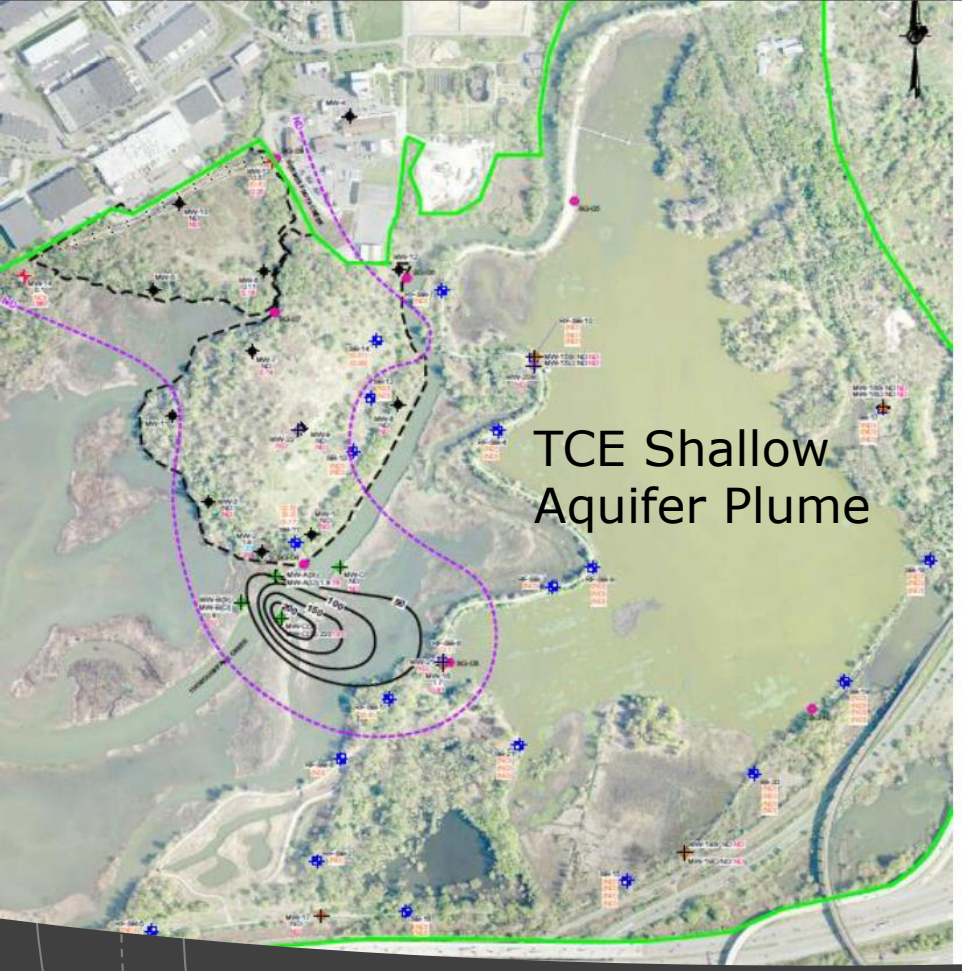
LDCA OU3 – Porewater

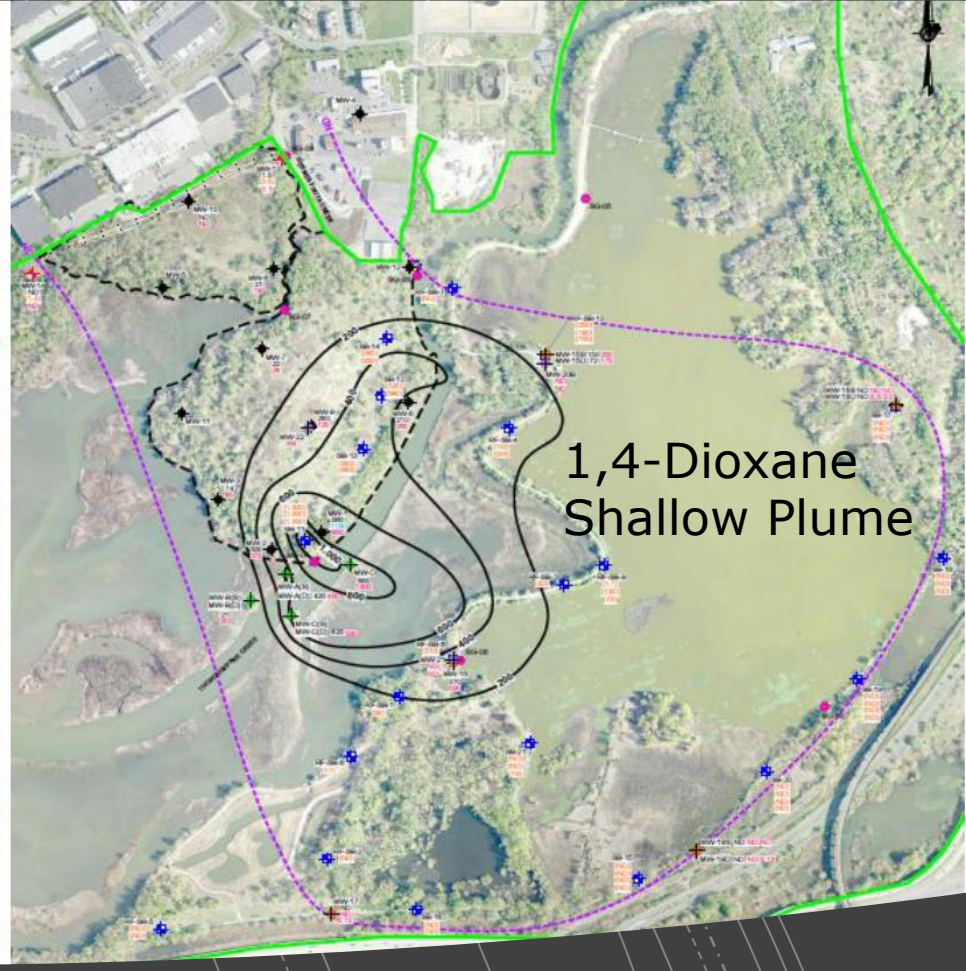


OU3 Progress & Schedule

- Interim Remedy FFS Complete – 2022
- Evaluating several *in situ* containment technologies as well as GW extraction
  - Permeable Reactive Barriers
  - Enhanced *In Situ* Bioremediation
  - Phytoremediation
  - Engineered Treatment Wetlands
  - On-site GW Treatment Plant
- Creek sampling – Summer 2022
  - PFCs & 1,4-D
  - Surface water, Sediment, Porewater
- Final Remedy FFS Start – Fall 2022


Industrial Drive Properties
Clearview Landfill
Darby Creek
Sun Oil Darby Creek Tank Farm
Delaware County Emergency Training Center
Delaware County Sewage Treatment Plant
30' R/W Delcora
Hermesprota Creek
Folcroft Landfill Annex
Former Delaware County Incinerator #2
Darby/Thoroughfare Creek
95
Folcroft Landfill
Muckinpattis Creek
John Heinz National Wildlife Refuge
Refuge Boundary
95
Philadelphia





Folcroft Landfill (OU2)

- FS for Landfill and Groundwater plumes planned complete in 2023
- Limited ecological risk to surface soils on Landfill
- Primary GW contaminants: TCE & daughter products, 1,4-dio
- GW Plumes do not discharge to surface water based on available data

LDCA OU4 – Aquatic Environments

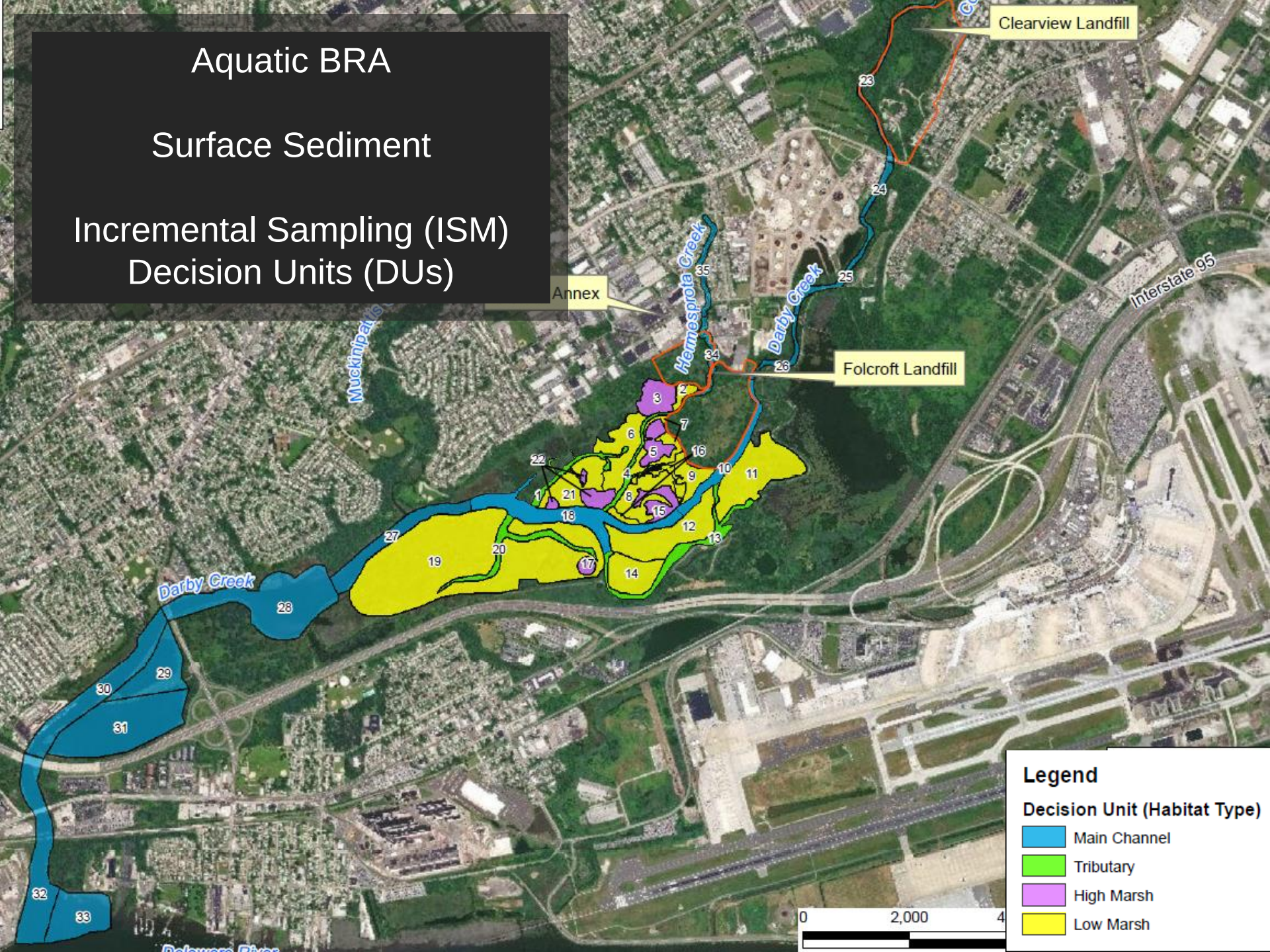
- Aquatic Baseline Risk Assessment Complete
  - Extensive, highly variable contaminants concentrations
  - Greatest human health risk from fish and turtle consumption
    - Pesticides, PCBs, Dioxins/Furans
  - Eco risks for multiple receptors and food chain

- FS underway - data gap sampling in Spring/Summer 2023.
  - Background & non-LDCA sources
  - Investigate potential sediment “hot spots”
  - Long-term monitoring program
  - Data to supplement Flood Event Sediment Transport Modeling

LDCA OU4 – Aquatic Environments

- Fish consumption
  - Community & Municipality outreach
  - Coordination with Heinz Refuge and Municipalities on new signage
  - Pending PADEP new fish tissue data
  - Educational efforts and outreach for specific populations

- Flood modeling with EPA Office of Research and Development

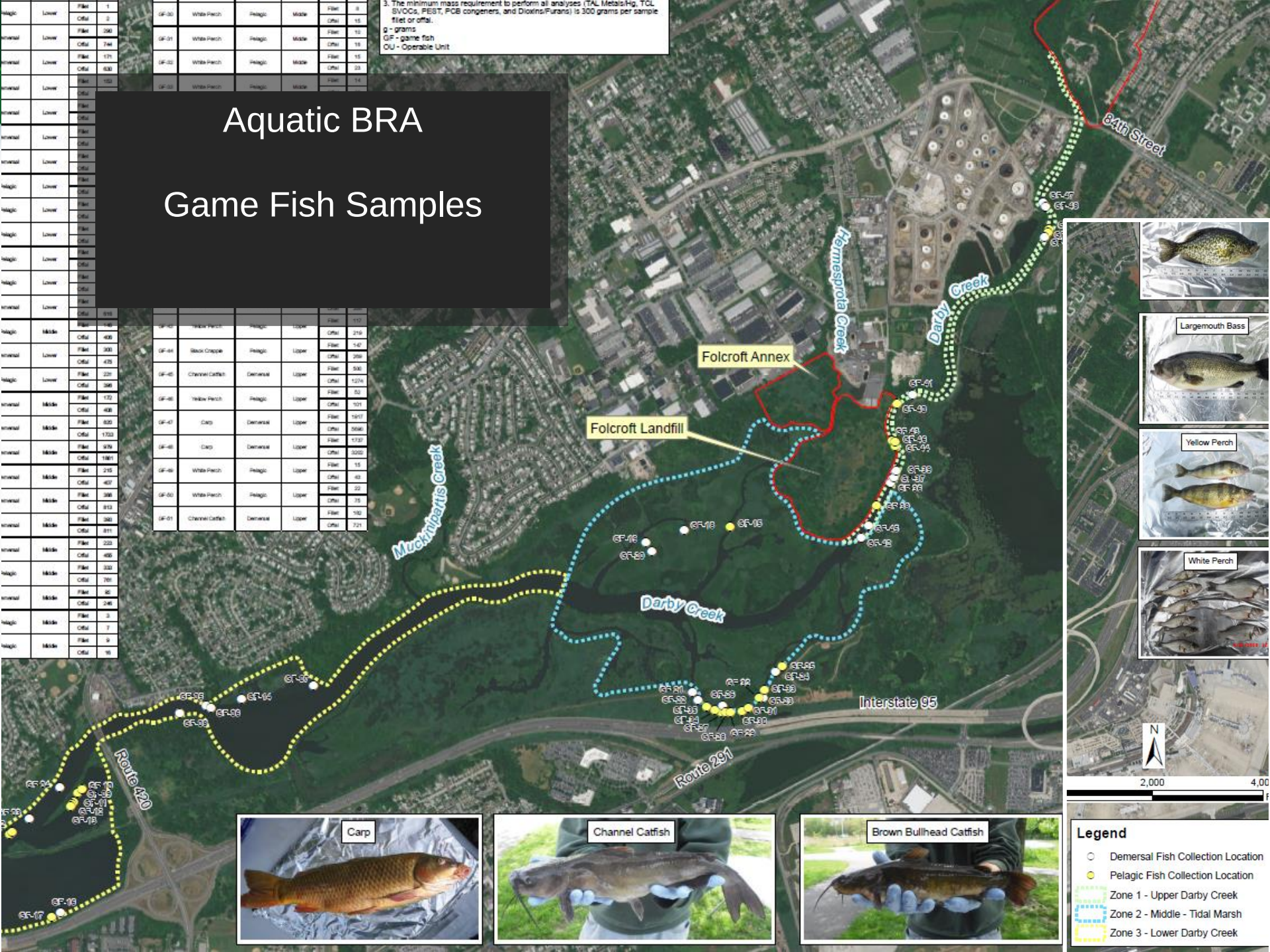

Aquatic BRA
Surface Sediment
Incremental Sampling (ISM)
Decision Units (DUs)
Clearview Landfill
Annex
Folcroft Landfill
Hermesprota Creek
Darby Creek
Muckinipattis
Interstate 95
Legend
Decision Unit (Habitat Type)
Main Channel
Tributary
High Marsh
Low Marsh
0
2,000

Aquatic BRA

Game Fish Samples

Pelagic	Lower	Fillet	1	GF-30	White Perch	Pelagic	Middle	Fillet	8
		Offal	2					Offal	15
Demersal	Lower	Fillet	290	GF-31	White Perch	Pelagic	Middle	Fillet	10
		Offal	744					Offal	18
Demersal	Lower	Fillet	171	GF-32	White Perch	Pelagic	Middle	Fillet	15
		Offal	630					Offal	23
Demersal	Lower	Fillet	152	GF-33	White Perch	Pelagic	Middle	Fillet	14
		Offal						Offal	
Demersal	Lower	Fillet						Fillet	
		Offal						Offal	
Demersal	Lower	Fillet						Fillet	
		Offal						Offal	
Demersal	Lower	Fillet						Fillet	
		Offal						Offal	
Pelagic	Lower	Fillet						Fillet	
		Offal						Offal	
Pelagic	Lower	Fillet						Fillet	
		Offal						Offal	
Pelagic	Lower	Fillet						Fillet	
		Offal						Offal	
Pelagic	Lower	Fillet						Fillet	
		Offal						Offal	
Pelagic	Lower	Fillet						Fillet	
		Offal						Offal	
Demersal	Lower	Fillet						Fillet	
		Offal	513					Offal	
Pelagic	Middle	Fillet	116					Fillet	117
		Offal	406					Offal	219
Demersal	Lower	Fillet	300	GF-44	Black Crappie	Pelagic	Upper	Fillet	147
		Offal	475					Offal	269
Pelagic	Lower	Fillet	231	GF-45	Channel Catfish	Demersal	Upper	Fillet	530
		Offal	396					Offal	1276
Demersal	Middle	Fillet	172	GF-46	Yellow Perch	Pelagic	Upper	Fillet	52
		Offal	408					Offal	101
Demersal	Middle	Fillet	820	GF-47	Carp	Demersal	Upper	Fillet	1917
		Offal	1703					Offal	5590
Demersal	Middle	Fillet	979	GF-48	Carp	Demersal	Upper	Fillet	1737
		Offal	1961					Offal	3202
Demersal	Middle	Fillet	218	GF-49	White Perch	Pelagic	Upper	Fillet	15
		Offal	407					Offal	43
Demersal	Middle	Fillet	396	GF-50	White Perch	Pelagic	Upper	Fillet	22
		Offal	813					Offal	75
Demersal	Middle	Fillet	340	GF-51	Channel Catfish	Demersal	Upper	Fillet	182
		Offal	811					Offal	721
Demersal	Middle	Fillet	223						
		Offal	466						
Pelagic	Middle	Fillet	333						
		Offal	781						
Demersal	Middle	Fillet	95						
		Offal	246						
Pelagic	Middle	Fillet	3						
		Offal	7						
Pelagic	Middle	Fillet	9						
		Offal	16						

3. The minimum mass requirement to perform all analyses (TAL Metals/Hg, TCL SVOCs, PEST, PCB congeners, and Dioxins/Furans) is 300 grams per sample fillet or offal.
g - grams
GF - game fish
OU - Operable Unit



Questions?

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LDCA Website:
http://www.epa.gov/superfund/lowerdarby